

## CLAIMS

We claim:

1. An apparatus for generating a live component comprising:
  - (a) a resource library;
  - (b) a live component editor for allowing a user to edit said live component utilizing resources from said resource library;
  - (c) a library of pre-built application modules;
  - (d) a viewer generator for creating a live component viewer from said pre-built application modules directed by said live component editor; and
  - (e) a component description generator for creating a live component description file directed by said live component editor.
2. The apparatus according to claim 1, wherein said live component editor is a live component editor and simulator capable of simulating said live component.
3. The apparatus according to claim 1, wherein said live component is downloaded from a server to a local system, wherein algorithms in said live component are executed on said local system.
4. The apparatus according to claim 1, wherein said pre-built application modules include computer executable instructions selected from the group consisting of:
  - (a) compiled code;

- (b) assembled code; and
  - (c) interpreted script.
5. The apparatus according to claim 1, wherein said live component viewer includes computer executable instructions selected from the group consisting of:
- (a) compiled code;
  - (b) assembled code; and
  - (c) interpreted script.
6. The apparatus according to claim 1, wherein said live component description file includes live component viewer instructions.
7. The apparatus according to claim 6, wherein said live component viewer instructions include XML.
8. The apparatus according to claim 6, wherein said live component viewer instructions includes data links.
9. The apparatus according to claim 7, wherein said XML is MathML.
10. The apparatus according to claim 9, wherein said MathML includes live MathML extensions.

11. The apparatus according to claim 10, wherein said live MathML extensions comprises at least one extension selected from the group of:
  - (a) a bi-directional equals operator;
  - (b) an edit attribute indicating if a value is editable; and
  - (c) a display attribute indicating a name and format for a display.
12. The apparatus according to claim 1, wherein said resource library includes at least one of the set of:
  - (a) rules;
  - (b) definitions;
  - (c) default values; and
  - (d) resources.
13. A method for generating a live component comprising the steps of:
  - (a) opening an initial live component with a live component editor;
  - (b) iteratively updating said live component by:
    - (i) selecting an operand for modification;
    - (ii) selecting a step from the group of steps consisting of:
      - (1) modifying the properties of said selected operand; and
      - (2) inserting an additional operation, selected from a library of pre-built application modules, that operates on said operand using predetermined rules that correspond to said additional operation;

- (c) saving the modified live component by:
  - (i) creating a live component viewer using said pre-built application modules directed by said rules based editor; and
  - (ii) creating a live component description file directed by said rules based editor.
- 14. The method according to claim 13, wherein said live component editor is a live component editor and simulator.
- 15. The method according to claim 13, wherein said initial live component is a default live component.
- 16. The method according to claim 13, further including the step of downloading said live component from a server to a local system, wherein algorithms in said live component are executed on said local system.
- 17. The method according to claim 13, wherein said pre-built application modules include computer executable instructions selected from the group consisting of:
  - (a) compiled code;
  - (b) assembled code; and
  - (c) interpreted script.

18. The method according to claim 13, wherein said live component viewer includes computer executable instructions selected from the group consisting of:
  - (a) compiled code;
  - (b) assembled code; and
  - (c) interpreted script.
19. The method according to claim 13, wherein said live component description file includes live component viewer instructions.
20. The method according to claim 19, wherein said live component viewer instructions include XML.
21. The method according to claim 19, wherein said live component viewer instructions includes data links.
22. The method according to claim 20, wherein said XML is MathML.
23. The method according to claim 22, wherein said MathML includes live MathML extensions.
24. The method according to claim 23, wherein said live MathML extensions comprises at least one one extension selected from the group of:
  - (a) a bi-directional equals operator;

- (b) an edit attribute indicating if a value is editable; and
- (c) a display attribute indicating a name and format for a display.

25. The method according to claim 13, wherein said resource library includes at least one of the set of:

- (a) rules;
- (b) definitions;
- (c) default values; and
- (d) resources.